

CLAIMS

1. An ink jet recording head driving method provided with a plurality of nozzles and a plurality of pressure generating chambers corresponding thereto by applying drive waveform signals to piezoelectric actuators provided at the positions corresponding to the pressure generating chambers in case of recording and rapidly changing the volume of pressure generating chambers filled with ink; thereby discharging ink droplets from said plurality of nozzles and forming dots on a recording medium,

said process comprising the steps of:

scanning said ink jet recording head in a first direction which is relatively orthogonal to the located direction of said plurality of nozzles concerning said recording medium and generating a plurality of drive waveform signals according to a jet amount of said ink droplets;

selecting any one or none of said plurality of waveform signals for each of said plurality of nozzles according to gray scale information of printing data; and

applying voltage to corresponding piezoelectric actuators, while said ink jet recording head is moved in a second direction which is relatively orthogonal to said first direction concerning said recordable medium.

2. The ink jet recording head driving method comprising a plurality according to claim 1, characterized in that at least one of a plurality of drive waveform signals generated at said dot forming process is different from any of a plurality of drive waveform signals generated at the previously executed dot forming process.

3. The ink jet recording head driving method comprising a plurality according to claim 1 or 2, characterized in that at said dot forming process,

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5. The ink jet recording head driving method comprising a plurality according to one of the claims 1 to 4, characterized in that said dot forming process is executed at least twice on one and the same place of said recording medium.

6. The inkjet recording head driving method comprising a plurality according to claim 5, characterized in that at said dot forming process, nozzles which are positioned at the different place from the nozzles used at the previously executed dot forming process pass the place opposed to one and the same place of said recording medium.

7. The ink jet recording head driving method comprising a plurality according to claim 5, characterized in that at the aforementioned dot forming process, nozzles which are positioned at the same place as the nozzles used at the previously executed dot forming process pass the place opposed to one and the same place of said recording medium.

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place opposed to one and the same place of said recording medium.

9. The ink jet recording head driving method comprising a plurality according to claim 8, characterized in that the number of times of the aforementioned dot forming process but also the number of times whereof the same or different nozzles pass the place opposed to one and the same place of said recording medium are determined on the basis of a high-speed printing mode which is set up for printing in high-speed and a high-quality image mode which is set up for printing in high-quality image.

10. An ink jet recording head driving circuit provided with a plurality of nozzles and a plurality of pressure generating chambers corresponding thereto applying drive waveform signals to piezoelectric actuators provided at the positions corresponding to the pressure generating chambers in case of recording and rapidly changing the volume of pressure generating chambers filled with ink; thereby discharging ink droplets from said plurality of nozzles; and forming dots on a recording medium,

said ink jet recording head driving circuit characterized in comprising:

a recording means which records drive waveform information on drive waveform signals at each jet amount of said ink droplets;

a waveform generating means which generates a plurality of drive waveform signals on the basis of information on a plurality of drive waveforms, which are read out from said recording means;

a control means which moves said ink jet recording head in a first direction which is relatively orthogonal to the located direction of said plurality of nozzles concerning said recording medium, and outputs waveform selecting signals indicating that, on the basis of gray scale information of printing data, any one or none of the plurality of drive

waveform signals, outputted from said plurality of waveform generating means, should be selected for each of said plurality of nozzles; and

a drive means which applies voltage to said piezoelectric actuators by selecting none or any one of a plurality of drive waveform signals outputted from said plurality of drive generating means on the basis of said waveform selecting data, characterized in repeating not only scanning of said ink jet recording head in the first direction but also outputting said waveform selecting data, while said control means moves said ink jet recording head in a second direction which is relatively orthogonal to said first direction concerning said recording medium.

11. An ink jet recording head driving circuit according to claim 10, characterized in that said waveform generating means generates at least one drive waveform signal which is different from any of a plurality of drive waveform signals generated at the previous scanning at every scanning of said ink jet recording head in a first direction.

12. An ink jet recording head driving circuit according to claim 10 or 11, characterized in that said waveform generating means generates drive waveform signals for discharging ink droplets with a large jet amount and those with a small jet amount in combination.

13. An ink jet recording head driving circuit according to claim 10 or 11, characterized in that said waveform generating means alternately generates a plurality of drive waveform signals for discharging ink droplets with a relatively large jet amount and those with a relatively small jet amount at every scanning of said ink jet recording head in a first direction.

14. An ink jet recording head driving circuit according to one of the claims 10 to 13, characterized in that said control means executes at least

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twice of not only scanning in the first direction of said ink jet recording head but outputting said waveform selecting data on one and the same place of said recording medium.

15. The ink jet recording head driving circuit according to claim 14, characterized in that said control means makes nozzles, which are positioned at the different place from the nozzles used for scanning of the ink jet recording head in the first direction, pass the place opposed to one and the first place of said recording medium.

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16. The ink jet recording head driving circuit according to claim 14, characterized in that said control means makes nozzles, which are positioned at the same place as the nozzles used for scanning of said ink jet recording head in the first direction, pass the place opposed to one and the same place of said recording medium.

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17. The ink jet recording head driving circuit according to claim 15 or 16, characterized in that said control means generates said waveform selecting data on the basis of the data, supplied from outside, concerning combination of drive waveform signals selected at not only once of scanning of said ink jet recording head in the first direction but also outputting the waveform selecting data.

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18. The ink jet recording head driving circuit according to claim 17, characterized in that combination of said drive waveform signals is determined on the basis of not only the number of times of scanning of said ink jet recording head in the first direction but also the number of times whereof the same or different nozzles pass the place opposed to one and the same place of said recording medium.

19. The ink jet recording head driving circuit according to claim 18, characterized in that the number of times of scanning of said ink jet recording head in the first direction but also the number of times whereof the same or different nozzles pass the place opposed to one and the same place of said recording medium are determined on the basis of a high-speed printing mode which is set up for printing in high-speed and a high-quality image mode which is set up for printing in high-quality image.

20. The ink jet recording head driving circuit according to claim 15 or 16, characterized in that said control means determines number of times of scanning of said ink jet recording head in the first direction but also number of times whereof the same or different nozzles pass the place opposed to one and the same place of said recording medium on the basis of a high-speed printing mode which is set up for printing in high-speed and a high-quality image mode which is set up for printing in high-quality image, determines the combination of drive waveform signals selected at not only once of scanning of said ink jet recording head in the first direction but also outputting said waveform selecting data on the basis of the determined number of times of scanning of said ink jet recording head in the first direction and number of times whereof the same or different nozzles pass the place opposed to one and the same place of said recording medium, and generates said waveform selecting data on the basis of the determined combination of said drive waveform signals.